Enhancing therapeutic support for inpatient infants and families by introducing Lullaby Hour to the neonatal unit

Musical interventions in a neonatal setting have been reported in some studies as having benefits for preterm infants, parents and staff wellbeing. This small service evaluation of a live musical intervention – Lullaby Hour – delivered by a musician and allied health professional staff in collaboration with neonatal colleagues and parents within a neonatal intensive care unit, aimed to consider if Lullaby Hour could be a beneficial addition to neonatal care.

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Key points

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1. A multi-method approach to support parents to develop a positive relationship with their infant is necessary on neonatal units.
2. An initiative such as Lullaby Hour can increase parent confidence with infant bonding and interaction, and in interpreting their infant's needs.

Allied health professionals (AHPs) work closely with neonatal nurses and medical staff on neonatal units to support parents of preterm and medically unwell infants as well as the infants themselves. Musical interventions in neonatal settings have been reported as having benefits for preterm infants, the parents and, indeed, staff wellbeing, however the current evidence base for using musical interventions is small. Such interventions traditionally accepted in other hospital environments (paediatric or adult wards) are often felt to be inappropriate for neonatal settings in view of the neonatal patients' developmental immaturity.

The highly medicalised environment on a neonatal unit can potentially have a negative impact on an infant with associated adverse neurodevelopmental outcomes. Challenging stimuli within a neonatal unit can be minimised by use of developmental care principles and approaches. The rationale underpinning developmental care has expanded to include family-integrated care, where parents are seen as essential partners when caring for their infant.[1] Involving parents early on in an infant's care can help understanding of foundation strategies such as skin-to-skin time, enjoyable early communication and interaction time, non-nutritive sucking with associated positive oral touch, taste and smell, and first feeding experiences. Supporting co-occupations such as nappy changing, wrapped bathing and ensuring sleep time is protected, can help towards a quicker discharge home.

Musician Emma Stevens at a 1:1 session of Lullaby Hour on the neonatal unit.

Infants born preterm are at high risk of developmental difficulties in the longer term.[2] Involving parents in therapeutic interventions and providing strategies that reduce stress and that support infant engagement and development are crucial as infants may need ongoing support once discharged home.[3]

Using music on the neonatal unit

Using music therapeutically on the neonatal unit is one form of intervention that can be used with parents and their infants, with claims that it can benefit autonomic system and vagal development.[4] The neonatal environment can be unintentionally noisy with excessive ambient sound levels, which can potentially lead to negative outcomes for preterm infant brain

development.[5] The noisy and challenging neonatal environment can also be stressful for parents struggling to learn how to bond and care for their infant. Music can be one method that mitigates negative auditory experiences by providing a positive and developmentally beneficial sound experience.[6]

To consider if therapeutic use of music in an inner-city neonatal intensive care unit (NICU) could be useful, we investigated using Lullaby Hour with infants and their mothers. Lullaby Hour is a musical intervention led by a singing musician supported by a guitar while encouraging parents to hold their infant, listen or sing to them in the presence of an occupational therapist.

This service evaluation was a small feasibility study to evaluate the potential use of Lullaby Hour within the NICU setting, supported by the occupational therapist through use of physiological observations and parent feedback. This project was registered with the Trust Clinical Governance team as a service evaluation project.

Methodology

Our unit has an established AHP team comprising occupational therapists, speech and language therapists, physiotherapists, clinical psychologists and dietitians who support parent and infant needs, developing and strengthening early bonding, pain relief, feeding skills, early communication (language and literacy) and ensuring appropriate nutritional intake. As a team, we had been aware of recent papers highlighting the benefits of various forms of music therapy on the neonatal unit setting. We wanted to consider if using music in some format could be a useful addition to the range of therapy strategies already offered. Specifically, the use of music could be a method of highlighting to the whole team the importance of the auditory setting for infants and families. Within this context, it is additionally essential that a variety of therapeutic approaches are encouraged and used on the unit to strengthen the infant-parent relationship, and to promote parent wellbeing.

This feasibility study involved a one-off observation of infants and their responsive states during Lullaby Hour when with their primary carer. The primary investigator was a highly experienced neonatal unit occupational therapist who is a lecturer for the Newborn Behavioural Observations (NBO) and Neonatal Behavioural Assessment Scale (NBAS) and has high rater-reliable fidelity when assessing infant responses to others and the environment.

Infant characteristic	Range
Gestational birth age	$24^{+0} - 34^{+2}$ weeks
Birth weight	700 – 1,770g
Post-menstrual age range of infants at onset of Lullaby Hour	$26^{+4} - 43^{+0}$ weeks

TABLE 1 Infant characteristics (n=10).

Individual Lullaby Hour sessions were 1:1 for each infant-parent dyad, at the cotside on the neonatal unit. A session was led by the musician and the occupational therapist, with support from various members of the neonatal team according to availability (this could be other AHPs, nurses or doctors). The songs included early nursery rhymes but parents could choose songs that had meaning for them, for example, Bob Marley's Three Little Birds, Coldplay's Yellow and various Elvis Presley songs, all played in the style of a lullaby. The musician was paid from charity funds.

The observations included careful study of autonomic stability, the quality of tone and motor level, capacity for self-regulation, response to stress and visual, auditory, and social-interactive capacities of each infant.[7] The principles of newborn behavioural observations[7] are frequently used to structure observations of infants born preterm receiving care on neonatal units and have been acknowledged as an accurate way of understanding an infant's neurobehaviour.

Oxygen saturation levels and heart rate were also recorded from readings presented on the pulse oximeter. Informal qualitative data were collected via direct observations and informal parent interviews. The Lullaby Hour methodology included ensuring blinds were drawn in the area the infants were being cared for during the session to create a calm, quiet environment.

The participants were 10 infants born preterm and their primary family carer (10 parents). The participants were recruited from an inner city neonatal unit (**TABLE 1**). Parents were informed via the parent information board on the unit about the Lullaby Hour and were self-selecting. One individual session was offered to each of the infants and parents who volunteered to participate. Inclusion criteria for infants were:

1. No longer requiring care in an incubator
2. Physiologically stable when held.

Inclusion criteria for family carers included:

1. Being the primary adult supporting the infant in their care on the neonatal unit
2. A willingness to attend the Lullaby Hour sessions on the unit with their infant.

Findings

The infant observations using the NBO criteria[7] indicated positive outcomes for all infant participants. Oxygen saturation levels were stable and appropriate (mean ± SD = 95.1 ± 3.08), as were heart rate readings (mean ± SD = 159.2 ± 9.610). No incidents of apnoea occurred and none of the infants displayed effortful respiratory patterns throughout the sessions. All infants were settled and comfortable and did not show any signs of stress. It is interesting to note that for all individual sessions, the setting of each infant required preparation in terms of reducing lighting and noise.

Informal parent ratings highlighted that 90% of parents strongly agreed that they enjoyed the session, with 80% indicating that the session helped them feel relaxed, and that it improved their emotional wellbeing. Of the sample, 70% reported that they felt the session was good for the health of their infant, but only 60% suggested that the session helped them develop infant bonding. A total of 21 neonatal staff were invited to give feedback using informal ratings. Reponses showed that staff had a positive experience of Lullaby Hour. Staff agreed that the session was of good quality (93%), and they reported finding the session enjoyable (83%). Staff also stated that Lullaby Hour makes the hospital a better place to work (72%) and that it helped to improve their own emotional wellbeing (69%).

Considerations

Both music and language exposure when used in a sensitive and facilitative way can elicit appropriate stimulation and enhance premature infant physiological and neuro-

behavioural development.[8,9] However, excessive auditory exposure has the potential to overstimulate an infant's immature and developing auditory system and therefore alter physiological function and nervous system organisation. Consequentially, using music as a therapeutic approach on a neonatal unit is still controversial.[4] The appropriate amount of auditory stimulation through use of singing for infants born preterm is poorly understood at present, although both maternal speech and singing are known to have physiological benefits.[10]

Was Lullaby Hour a beneficial addition to the therapeutic neonatal care provided in our neonatal units? All infants demonstrated positive behavioural and physiological responses to the music. Parents and staff reported finding Lullaby Hour an enjoyable experience that benefitted themselves and their infants. While a minority of infants showed fleeting signs of agitation and sensory overload, these were quickly alleviated if opportunities to help reduce infant stress behaviours were provided.

The neonatal unit is often chaotic and noisy[11] but both staff and parents stated that Lullaby Hour created a calm and relaxing environment. Rather than being overwhelming or stressful, parents and staff agreed that Lullaby Hour was calming, improved the NICU environment and had benefits to their wellbeing, parent-infant interactions and for the infants themselves. These benefits were reported to continue even after Lullaby Hour had stopped. The beneficial impact of Lullaby Hour on the NICU environment fulfils one of the goals of the intervention: to provide a supportive and calm hospital environment.[1]

This study was the first to assess the impact and feasibility of Lullaby Hour at our NHS Trust. While our approach provides a basic understanding of the impact of Lullaby Hour, the sample size for each group is small. Data collection for staff responses coincided with the COVID-19 pandemic and, as a result, the survey was shut earlier than planned. Despite this, the study has important clinical implications; the sensitivity demonstrated by some of the infants highlights the need for and importance of, individualised developmental care[1] supported by behavioural observations. It was noted that all parent participants were caring for infants who were medically stable, with no significant and persistent medical problems and who were preparing for discharge home. Therefore, using Lullaby Hour may help prepare parents for discharge home as it would enable them to use, build on and generalise therapeutic strategies encouraged earlier in their infant's development, ie stress cue responsiveness and early communication.

The study contributes to good practice by involving staff and families of infants on the NICU in reviewing neonatal services.[12] It was, however, a feasibility study using only a very small sample; therefore it is difficult to draw any firm conclusions about the benefits of Lullaby Hour. Further studies alongside careful scrutiny of the literature are needed.

The way forward

Perhaps the most important finding from our survey was that, when the team came to undertake the session with each infant, the neonatal environment had to be prepared in 100% of cases, ie by reducing the lighting and noise. For us as a team, this has highlighted that it is still necessary to continue educating everyone about the importance of maintaining a quiet and suitably lit neonatal setting.

Our service review suggests that when delivered alongside developmental care, Lullaby Hour could be a beneficial addition to therapeutic interventions and holistic care provided in the NICU. We feel the music sessions are an important part of the range of tools used to create positive and developmentally beneficial experiences for infants and their families; we would like to repeat Lullaby Hour. Given the complex needs of the infants on the unit, there are no immediate plans to use music with younger infants; it is an approach best suited at later stages in an infant's neonatal journey while preparing for home.

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